

## Assessing the kinetic model of hydro-distillation and chemical composition of *Aquilaria malaccensis* leaves essential oil

### ABSTRACT

This study aimed to model the kinetic of hydro-distillation of *Aquilaria malaccensis* leaves oil in order to understand and optimize the extraction process. In addition, this study, for the first time, aimed to identify the chemical compositions of the *A. malaccensis* leave-oil. By assessing both first-order kinetic model and the model of simultaneous washing and diffusion, the result indicated that the model of simultaneous washing and diffusion better describes the hydro-distillation mechanism of the essential oil from *A. malaccensis* leaves. The optimum time, solid to liquid ratio, and the heating power for extracting the highest amount of essential oil were found to be around 3 h, 1:10 (g·ml<sup>-1</sup>), and 300 W respectively. Yellow essential oil with a strong smell and a yield of 0.05 v/w was extracted by hydro-distillation Clevenger apparatus. Chemical compounds of the essential oil were analyzed using gas chromatography–mass spectroscopy (GC/MS), which resulted in identification of 42 compounds that constitute 93% of essential oil. Among the identified components, Pentadecanal (32.082%), 9-Octadecenal, (Z) (15.894%), and Tetradecanal (6.927%) were the major compounds. Considering the fact that all the identified major components possess pesticidal properties, *A. malaccensis* leaves can be regarded as a promising natural source for producing pesticides.

**Keyword:** *Aquilaria malaccensis*; Essential oil; Hydro-distillation; Optimization; Kinetic modeling